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Cervicitis in Adolescents: Do Clinicians Understand Diagnosis and Treatment?

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Abstract

Background—Cervicitis is widespread, but no studies have examined cervicitis in accordance with established guidelines for diagnosis and treatment. Study objectives were to describe adherence to Centers for Disease Control and Prevention guidelines for diagnosis and treatment of cervicitis within an adolescent population and to compare factors associated with adherence to guidelines in a primary care setting and the Emergency Department.

Methods—Data were collected as part of a retrospective chart review of evaluation, diagnosis, and treatment of STI in adolescent women in an outpatient setting. Participant charts were eligible for review if they were 12–21 years of age and were given an ICD-9 and chart diagnosis of cervicitis. Two primary outcome variables: meeting cervicitis guidelines and correct treatment among those meeting cervicitis guidelines (no/yes) were utilized; the study controlled for age, race, venue, past infection with chlamydia or gonorrhea.

Results—Subjects (n = 365) were examined for the primary outcome variables and 75.1% (274/365) met at least one criterion for cervicitis. Of these, 166 (60.9%: 166/274) subjects were found to meet criteria for cervicitis alone, versus subjects meeting criteria for both cervicitis and pelvic inflammatory disease (PID) (39.4%: 108/274). The majority, 89.3%, (326/365) were treated for both chlamydia and gonorrhea, but only 64.7% (211/326) were treated correctly for both infections.

Conclusions—Our findings suggest that knowledge deficits exist in diagnosis and treatment of cervicitis in adolescent patients and in differentiating between cervicitis and PID. Educational tools, simulated patient exercises, and order sets may be warranted for quality improvement to allow for improved care of this at risk sexually active population.

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Keywords

Cervicitis; Adolescents; Pelvic inflammatory disease; CDC

Introduction

Chlamydia trachomatis and Neisseria gonorrhea are the most common reportable bacterial sexually transmitted infections (STI) in the United States with more than 1.5 million cases reported in 2008; over 1.2 million chlamydia cases and nearly 350,000 gonorrhea cases were reported to the Centers for Disease Control and Prevention (CDC). Chlamydial rates have increased by 9.2% from 2007 to 2008, and gonorrhea rates have stagnated over the past decade after many previous years of decline.¹ These rates reflect many factors in addition to a rising infection rate. Escalating rates also indicate an increase in screening, use of more sensitive and specific diagnostic tests, increased emphasis on case reporting from providers and laboratories, and improvements in information systems for reporting.² With improved screening, early diagnosis may be achieved in addition to prevention of cervicitis sequelae: ectopic pregnancy, pelvic inflammatory disease (PID), chronic pelvic pain, tuboovarian abscess and ultimately infertility.³

Adolescent women ages 15-24 are at considerable risk for STI, carrying a substantial burden of chlamydia and gonorrhea.¹ This age group represents 25% of the sexually active population in the United States, but acquires nearly 50% of all new STI.⁴ Adolescents often underestimate their susceptibility to STI; even those diagnosed with an infection see themselves at little to no risk in greater than 80% of cases.⁵

The United States Preventive Services Task Force (USPSTF), CDC, and American College of Obstetricians and Gynecologists (ACOG) recommend screening sexually active women 25 years and younger annually for Chlamydia and Gonorrhea.⁶ The CDC recommends re-screening for this age group after positive tests in 3-4 months, every 6 months regardless of new partners, and every time a new sex partner is acquired.^{6,7} Despite these recommendations, health care workers too often fail to screen this at risk group. Physicians and nurse practitioners have been shown to under-screen women 25 years and younger while routinely screening women over 25 despite the USPSTF, CDC, and ACOG guidelines.⁸ These studies suggest that physicians need to be aware of the high STI burden of the 15–24 year age group and their subsequent need for frequent testing and potential treatment.

Physicians and other health care providers play a critical role in adolescent health. STI treatment guidelines from the CDC have existed since 1982. The guidelines, updated every 3-5 years, was most recently published in late 2010. Our study focuses on the 2006 STD Guidelines published by the CDC as the chart review evaluates patients seen from 2006 to 2008. The goal is to provide safe and effective treatment options, prevention strategies, and diagnostic recommendations. Within these guidelines, cervicitis exists with either purulent/mucopurulent endocervical discharge or endocervical bleeding 'easily induced by gentle passage of a cotton swab through the cervical os'.⁷ Studies have previously examined STI in the Emergency Department (ED) setting, but predominantly involved adult patients. Such studies exhibited overtreatment of lower risk groups, under treatment of higher risk groups,

and minimal prevention messages to those diagnosed with an STI.^{9,10} Compliance with guidelines for cervicitis was found to be as low as 3% in the adult emergency department patient population.¹¹ Adolescents with urinary complaints have also been investigated in the ED setting with missed testing opportunities in 50% of subjects.¹²

Studies have rarely focused on the primary care setting itself, and typically focus on the adult population when they are conducted. Such studies are also limited by the number of patients seen by providers; physicians often report seeing 0–5 patients with cervicitis within the past year.¹³ No studies have examined the diagnosis and treatment of cervicitis in accordance with established guidelines within the highest risk group, adolescents. Accordingly, the objectives of this study were to: (1) describe adherence to CDC guidelines for diagnosis and treatment of cervicitis within an adolescent patient population; (2) compare factors associated with adherence to guidelines in a primary care setting and the Emergency Department.

Methods and Participants

Procedure

Data were collected as part of a retrospective chart review of evaluation, diagnosis, and treatment of STI in adolescent women. The larger study (initiated in 2009) included evaluation of pelvic inflammatory disease and vaginitis in addition to cervicitis. Charts from 01/01/2006 to 12/31/2008 were reviewed for an International Classification of Diseases, Ninth Revision (ICD-9) diagnosis code of cervicitis. Subjects were adolescent women receiving health care at a primary care adolescent medicine clinic staffed by adolescent medicine specialists or emergency department associated with the local children's hospital in Little Rock, Arkansas. The clinic primarily serves lower-and middle-income residents in areas with high rates of sexually transmitted infection. Participant charts were eligible for review if they were 12–21 years of age and were given an ICD-9 diagnosis of cervicitis.

A data set was established based upon this coding diagnosis. Electronically scanned visit notes were reviewed in the medical record to assess visit data from an outpatient primary care adolescent medicine clinic and the children's hospital emergency department. Subjects were excluded if data were not available, charting was incomplete, or if the visit was a follow-up from the original diagnosis visit. Data extracted from charts included patient demographics, time and date of visit, venue of visit (clinic vs Emergency Department), patient symptoms, examination, laboratory, and treatment information. All authors reviewed data for accuracy; any discrepancies were reviewed utilizing the subject medical records. This research was approved by the institutional review board of the University of Arkansas for Medical Sciences in Little Rock, Arkansas.

Variables

The established 2006 Centers for Disease Control and Prevention (CDC) STD Guidelines were utilized for correct diagnosis and treatment of cervicitis as they were the current guidelines at the time of the chart review. Major criteria for diagnosis of cervicitis according to the guidelines are: (1) purulent or mucopurulent endocervical discharge, or (2) endocervical bleeding. Outpatient treatment for cervicitis is also described in the guidelines

as either Azithromycin 1 g by mouth in a single dose or Doxycycline 100 mg by mouth twice daily for seven days to treat chlamydia and Ceftriaxone 125 mg intramuscularly or Cefixime 400 mg by mouth in a single dose to treat gonorrhea. Coverage for gonorrhea in addition to chlamydia is encouraged in areas of high prevalence >5%.¹¹ Also of note, although an established dosage of Cefpodoxime was not officially established by the 2006 STD Guidelines, studies had been performed showing that a 200 mg oral dosage was insufficient for minimum efficacy criteria.¹¹ In order to evaluate the potential for confusion between cervicitis and pelvic inflammatory disease, the criteria for pelvic inflammatory disease (PID) were also evaluated. For a diagnosis of PID, a patient must have one of the following: cervical motion tenderness, uterine tenderness, adnexal tenderness. Using chart review, we recorded the occurrence of two primary outcome variables: meeting cervicitis diagnostic criteria (no/yes) and correct treatment among those meeting cervicitis guidelines (no/yes). We also controlled for race (African American/Non African American), age, venue (adolescent clinic, emergency department), current/past infection (no/yes) with gonorrhea or chlamydia.

Descriptive statistics, including chi-square tests and difference in means t-tests were used to evaluate relationships between diagnosis and treatment. All effects were significant at $P < 0.05$ (SPSS, Version 17.0).

Results

Larger Dataset

We initially identified 544 subject charts that included an ICD-9 guideline based diagnosis of cervicitis (Fig.1). Of these, 179 were excluded from analyses due to missing data or the visit being a follow-up appointment only for a previous diagnosis of cervicitis, leaving 365 (67.0%: 365/544) subjects available for the current study. We further identified those with at least one criterion for cervicitis (75.1%: 274/365). Of these, 166 (60.9%: 166/274) subjects were found to meet criteria for cervicitis alone, versus subjects meeting criteria for both cervicitis and PID (39.4%: 108/274).

Characteristics of Subjects Examined for Study

Of the subjects retained, the mean age was 17.6 years (SD = 1.7 years), and 82.5% of subjects were African-American. Seventy-five percent of subjects (276/365) were seen in the emergency department. Of subjects, 34.8% (127/365) had a previous infection with chlamydia, 14.8% (54/365) had a previous diagnosis of gonorrhea and 11% (43/365) had a previous infection with both chlamydia and gonorrhea. About six percent (23/365) had previous PID infection.

Most subjects were screened for the two major causes of cervicitis: chlamydia and gonorrhea. Ninety-seven percent of subjects (354/365) were tested for chlamydia and 96% of subjects (352/365) were tested for gonorrhea alone as well as both infections. Three percent (11/365) of subjects were treated for chlamydia alone and 3.3% (12/365) were treated for gonorrhea alone. The majority (326/365) of subjects, 89.3% were treated for both chlamydia and gonorrhea, but only 64.7% (211/326) were treated correctly for both

infections. 4.4% (16/365) received treatment for neither infection. Results for chlamydia and gonorrhea showed that treatment was necessary in many subjects. Thirty percent of subjects (110/365) were positive for chlamydia, 14.2% (52/365) were positive for gonorrhea, and 10.1% (37/365) were positive for both infections.

Identification of Cervicitis Criteria

Of all subjects diagnosed with cervicitis, approximately 75% (274/375) met at least one major criterion for diagnosis. About 35% (97/274) had endocervical discharge only, 2.9% (8/274) had a friable cervix only and the majority (62.4%; 171/274) had both endocervical discharge and a friable cervix.

Subjects meeting at least one criterion were retained and data was further analyzed. Subjects were further classified into those meeting criteria for cervicitis alone (60.5%; 166/274) and those meeting criteria for cervicitis and PID with a resulting diagnosis of PID (39.4%; 108/274).

Comparison of Subjects Diagnosis and Treatment of Cervicitis

Comparative information is presented in Table 1 to assess subjects diagnosed with cervicitis. The first group was diagnosed with cervicitis but also meets criteria for PID (and thus should be categorized as PID). The second group met criteria for cervicitis only. Both groups were predominantly African-American and were older adolescents; the cervicitis group mean age was three years older than the PID group but was not significant. Subjects were seen more often in the adolescent clinic, accounting for 71% (196/274) of all visits; seventy-seven subjects were seen in the ED. Fever and abdominal, symptoms often used to support a diagnosis of PID were also significant in the comparative analysis at $P < 0.01$. Previous infection with chlamydia, gonorrhea, or PID was not significant.

Comparing subjects seen in the ED to subjects seen in the adolescent clinic, subjects were more often misdiagnosed in the ED. Of patients diagnosed with cervicitis in the ED, 52% (40/77) actually met diagnostic criteria for PID. In comparison, 35% (68/196) subjects were misdiagnosed with cervicitis while meeting the criteria for PID in the adolescent clinic.

Treatment

In accordance to the CDC STI treatment guidelines, many medication errors were made in the subjects diagnosed with cervicitis (Table 2). The most common error occurred with an excessive dosage of ceftriaxone, often the PID dosage (67 errors, 52.8% of all errors). An excessive dosage of Vantin with 800 mg over the standard 400 mg (45 errors, 35.4% of all errors) was also common. In total, there were 127 medication errors exhibited in accordance with the CDC cervicitis treatment guidelines.

Discussion

Diagnosis and treatment of cervicitis in adolescent patients often does not adhere to established guidelines. In our sample, PID was diagnosable in nearly half of all subjects ultimately diagnosed as cervicitis. This situation occurred largely in the emergency

department. These findings are not unprecedented, as other studies, such as Mussacchio et al,¹² have shown inconsistencies in provider care associated with adolescent patients. In addition to the care level, knowledge seems to be deficient in many health care professionals despite the long-established and consistently updated guidelines. This deficiency appears to extend even to those specially trained in adolescent care.

Even with correct diagnosis, correct treatment for cervicitis occurred for only two thirds of subjects. Providers appear to recognize the correlation between chlamydia and gonorrhea and a cervicitis diagnosis in most circumstances, but provision of medical therapy with many medication errors emphasizes that level of knowledge may not translate fully into utilization. Such medication errors also raise the question of recognition of established treatment guidelines for cervicitis. This level of adherence is especially disturbing in a population such as the study population with Chlamydia rates approaching 25% and Gonorrhea rates nearly 10% of the tested population. As subjects in our study were treated in accordance with the treatment guidelines more often in those that met criteria for cervicitis alone compared to subjects meeting criteria for cervicitis and PID, one must also ask whether some knowledge of cervicitis and PID guidelines exists, but are not fully followed.

These results do contrast with a 2006 survey where 70% of clinicians correctly diagnosed cervicitis with a plan to treatment for chlamydia and gonorrhea; nearly two thirds chose correct medical treatment.¹³ Additionally, Magid et al¹⁴ reported >95% compliance with CDC treatment guidelines of cervicitis. In two private health care plans from Colorado and Minnesota, 97% of nonpregnant subjects received proper treatment and over 50% of subjects were 15-24 years of age. Such a disparity may be linked to insurance source, differing socioeconomic status, and clinic setting. Further examination of such potential modulating factors is warranted.

Our results are similar to findings from Trent et al¹⁵ that investigated PID treatment and discharge instructions in primary and emergency care situations. In a small sample (n = 56), adolescent subjects received treatment in compliance with CDC STD treatment guidelines for less than 50% of visits in either a clinic or emergency department setting. These numbers mirror the poor adherence we found to cervicitis diagnosis and treatment guidelines. A 2004 retrospective study conducted in an urban, adult emergency department similarly exhibited full compliance with history, diagnostic criteria, physical examination, treatment, and follow-up in only 3% of subjects diagnosed with cervicitis.¹¹

From our study, it appears that the difference between cervicitis and PID is often misunderstood based upon exam criteria. In many circumstances, a symptom history of abdominal pain may bias the health care provider into automatically diagnosing PID despite no findings consistent with the diagnosis on abdominal or subsequent pelvic exam if performed.¹⁶ Although abdominal pain may be a supportive indicator of a PID diagnosis, it is not a criterion for diagnosis of either PID or cervicitis. Such a situation leads to overtreatment of cervicitis when one-time antibiotic dosage would be sufficient, and the patient may be psychologically affected with an inaccurate diagnosis of PID. Similarly,

many providers appear to connect endocervical discharge or friable cervix with PID instead of cervicitis thus leading to PID treatment for a patient with cervicitis.

At the end of 2010, the CDC published updated STD guidelines outlining some changes from the 2006 guidelines utilized in this study. Although the diagnostic criteria for cervicitis remain the same, the medications to treat cervicitis have been changed. The first line treatment for gonorrhea has changed to Ceftriaxone over oral medications as it has sustained bactericidal levels in the blood. The dosage of Ceftriaxone has also increased from 125 mg IM to 250 mg IM. As part of cervicitis treatment, quinolones are no longer acceptable due to widespread resistance against the medication. Providers should remain aware of these updated guidelines as they diagnosis and treat adolescents with presumed cervicitis.

Limitations

Limitations of study design and sample should be considered. First, the research sample was recruited from a population that was relatively homogeneous in terms of race/ethnicity, socioeconomic status, and geographic residence. The sample may not be representative of all adolescent women; however, data do present issues of incorrect diagnosis and treatment pertinent to all adolescent women. The study is also retrospective in nature, thus patients and providers could not be questioned directly. Additionally, ICD-9 coding diagnosis may have excluded subjects that actually had a diagnosis of cervicitis documented in the medical record.

Conclusions

Our findings suggest that a knowledge deficit exists in diagnosis and treatment of cervicitis in female adolescent patients. The study also suggests lack of knowledge in differentiating between cervicitis and PID. Emphasis on the application and adherence to established CDC guidelines for diagnosis and treatment of both conditions is imperative as we educate not only students and residents, but also experienced faculty and private practice practitioners. Comfort levels of providers should also be considered as they take sexual histories from adolescent patients. Previous studies have underscored that providers often do not ask in-depth questions adequate to expose high-risk sexual behaviors¹⁷ in adolescents. Primary care physicians also indicate feeling adequately trained for taking a sexual history in just over 50% of patient encounters.¹⁸

Our data highlight that increased educational experiences regarding cervicitis for those in fields with high exposure to adolescents should be the norm rather than an exception. Educational tools, simulated patient exercises, and order sets may also be warranted for quality improvement to allow for improved care of this at risk sexually active population.

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Fig. 1.
Selection of Subjects (N5274) in Current Project: Meeting Cervicitis Criteria or PID
Criteria.

Table 1
Comparisons in Factors among 274 Subjects Diagnosed with Cervicitis

	Cervicitis/PID Criteria Met (N=108)	Cervicitis Criteria Only Met (N=166)	χ^2 (df) or t (df)
Age (Mean, SD)	17.6 (1.85)	20.08 (3.16)	0.81 (271)
Race/Ethnicity (N, %)			2.3 (4)
African American	87 (80.6)	140 (84.8)	
White	18 (16.7)	22 (13.3)	
Other	3 (2.7)	2 (1.2)	
Diagnostic Venue, N (%)			6.8 (3) [†]
Adolescent Center	68 (63.0)	128 (77.6)	
Emergency Department	40 (37.0)	37 (22.4)	
Cervicitis Symptoms, N (%)			5.62 (2)
Endocervical discharge	30 (27.8)	67 (41.1)	
Friable cervix	1 (0.9)	3 (1.8)	
Endocervical discharge and Friable Cervix	77 (71.3)	93 (57.1)	
PID Symptoms, N (%)			261.00 (6) [‡]
No Symptoms	0 (0.0)	164 (100.0)	
Cervical motion tenderness (CMT) only	86 (79.6)	–	
Adnexal tenderness (AT) only	4 (3.7)	–	
Uterine tenderness (UT) only	1 (0.9)	–	
CMT and AT	14 (13.0)	–	
CMT and UT	2 (1.9)	–	
AT and UT	1 (0.3)	–	
CMT, AT and UT	1 (0.9)	–	
Fever greater than 101 at Exam, N (%)			9.6 (2) [†]
No	38 (35.2)	33 (20.0)	
Yes	1 (0.9)	0 (0.0)	
Unknown	69 (63.9)	132 (80.0)	
Abdominal Pain, N (%)			14.6 (2) [†]
No	67 (62.0)	134 (81.2)	
Yes	34 (31.5)	21 (12.7)	
Unknown	7 (6.5)	10 (6.1)	
Concurrently Diagnosed with STI, N (%)			1.94 (3)
GC Only	7 (6.7)	5 (3.1)	
CT Only	25 (23.8)	37 (23.1)	
GC and CT	10 (9.5)	17 (10.6)	
Neither	63 (60.0)	101 (63.1)	
Treated Correctly for CT, GC			6.2 (3) [*]
No	55 (50.9)	59 (35.8)	
Yes	53 (49.1)	106 (64.2)	

*
 $P < 0.05$

[†] $P < 0.01$

[‡] $P < 0.001$

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Table 2
Medication Errors among Subjects Treated for Cervicitis

Medication	Error	N (%)
Ceftriaxone	Excess dosage	67 (52.8)
Cefpodoxime	Excess dosage	45 (35.4)
Doxycycline	Excess dosage	6 (4.7)
Doxycycline	Insufficient dosage	6 (4.7)
Azithromycin	Excess dosage	2 (1.6)
Levofloxacin	Excess dosage	1 (0.8)
Total		127 (100%)